

Sanitary Sewer Plan- Update



Town Council Meeting
June 17, 2003



Additional Information

- Treatment Plant Capacity
- Information on Option Comparison
 - Future Sand Filter & Drip Dispersal Treatment Sites and Costs
 - Toms Creek Sewer, Costs
 - Review of Rate Impacts with Availability Fees
- Sewer Capacity Evaluation, for consideration of Building Permit Moratorium
- Format- June 24, 2003 Special Meeting



Treatment Plant Capacity

- Blacksburg VPI Sanitation Authority
 - Plant Capacity= 9 mgd
 - Average Flow = 6 mgd, 2002 Flow = 5.2mgd
- Overflow Reported February 2003
 - Operator Error in Pump 3 Startup
 - Reported Overflow = 600 gallons
- Reported to DEQ by phone February 22, 2003, and by Letter February 25, 2003
- No DEQ response received, No NOV



Options for Council to Consider

1. Upgrade Existing Sewer
2. Build Toms Creek Sewer, modified
3. Deep Cell Lagoon Sites
with subsurface dispersal
4. Bypass Force Main



Solutions, Scope:

Options	Upgrade Sewer in N. Main	New Sewer, Toms Creek	Deep Cell Lagoons at P.S.	Force Main Along Bypass
Corrects Capacity	Yes	Yes	Yes	Yes
Serves Build Out East of Bypass, based on Comprehensive Plan Land Use	Yes	Yes	No	Yes
Provides Sewer Service in Toms Creek for Comprehensive Plan Land Use	No	Yes	No	No

service.

Traditional waterfront development has often occurred on small lots with high water tables that are now considered unsuitable for conventional septic systems and therefore conducive to their failure. Recirculating sand filter systems can be extremely useful in mitigating this problem; in addition to having denitrifying ability, the systems can be easily placed in areas with slowly permeable soils, inadequate unsaturated soil buffer zones, and/or insufficient room for a conventionally-sized soil absorption area. Some homeowners choose to

there is a pump problem.

The pump then sends treated effluent to the sand filter (Figure 2a). The filter is built for free access and has only 45 ft² of surface area when used to treat the wastewater from a single family home. A 2,000-gallon center seamed concrete septic tank was selected as the sand filter container because it was readily available and could be placed completely out of the ground when necessary.

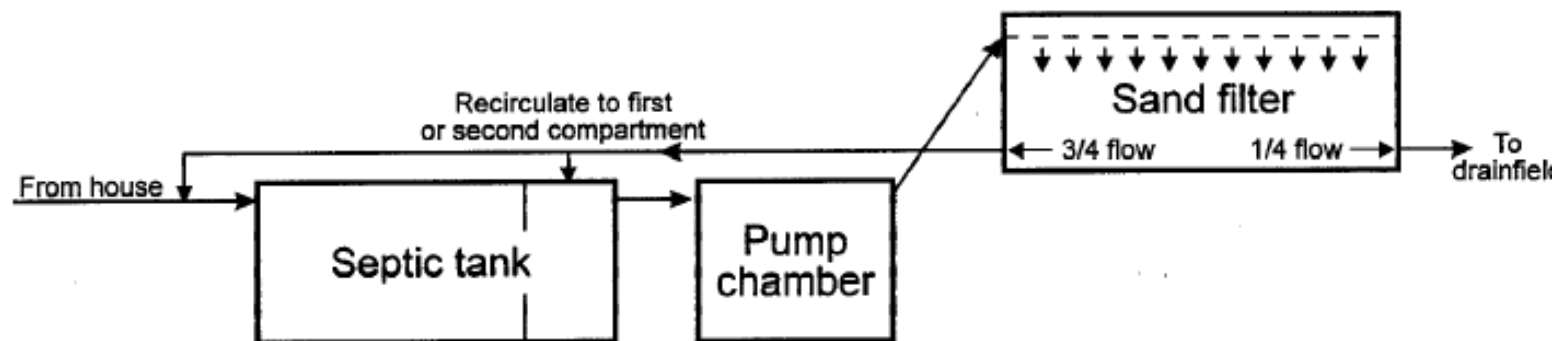
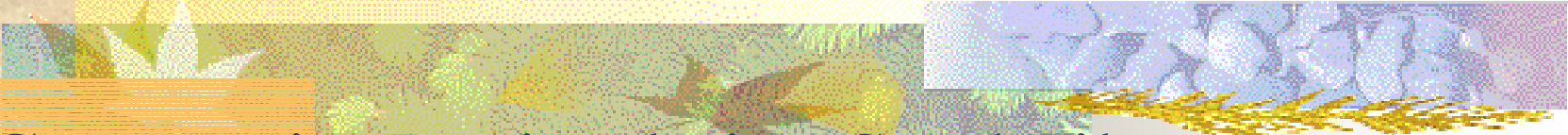


Figure 1: Schematic of a Recirculating Sand Filter



Community Recirculating Sand Filters

to Drip Dispersal - Assumptions:

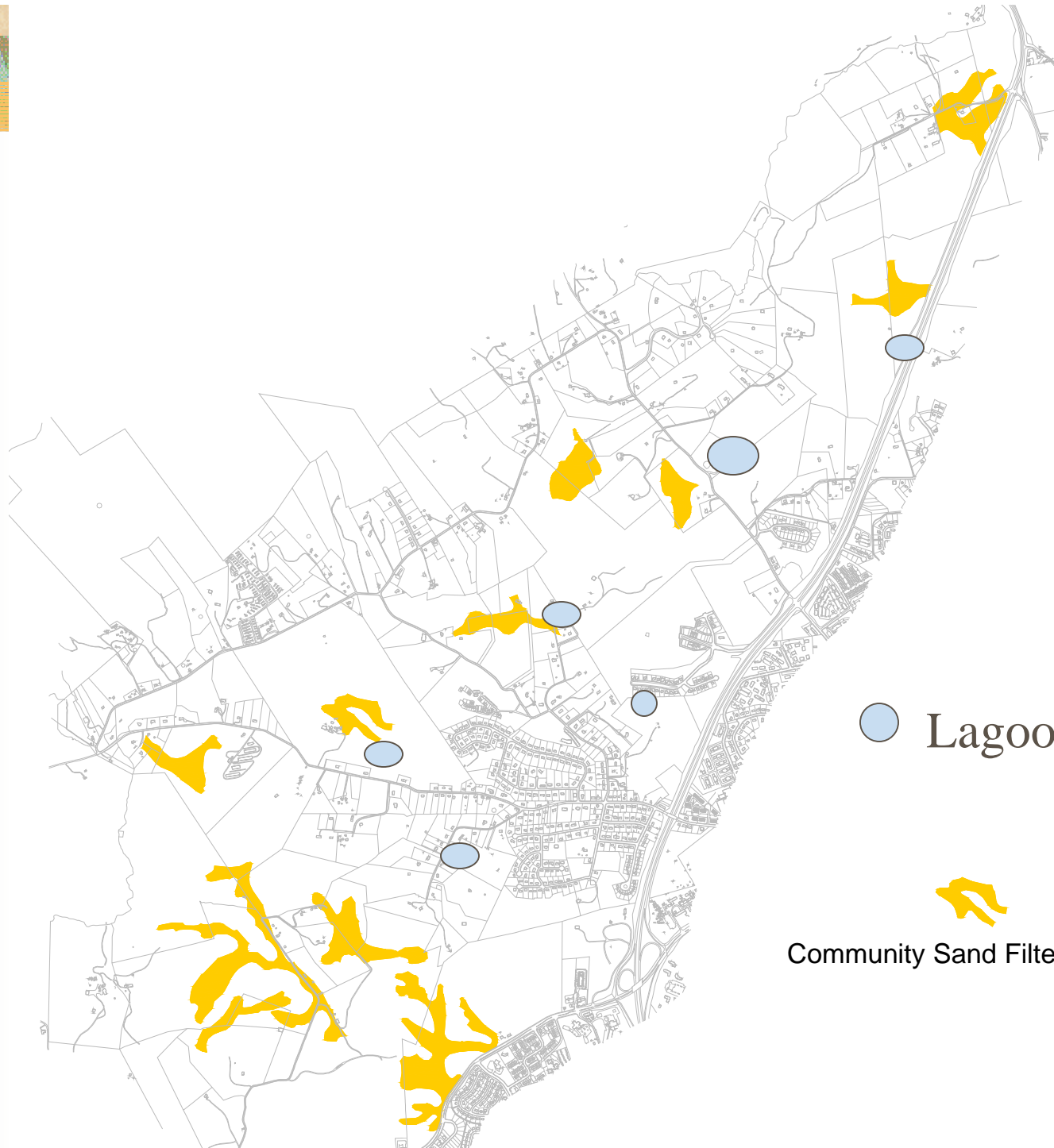
- STEP/STEG to site (primary treatment in septic tank)
- Utilize 10-20 sites (Working Group rec's)
- Build out 3500 homes (RR1), 400 gpd/home.
- Location Criteria: avoid roads, houses, shallow rock, steep slopes, floodplain (CVO); good permeability, not located on lagoon locations
- Perc. rate used to calculate drip fields = 120 min/inch
- Cost of design/construction = \$3-\$10 /treated gallon
 - depending on materials available,
 - no drip field costs estimated, would be additional
 - Source :National Small Flows Clearing House
- Cost of land: \$8,000/acre average. (2003 Assessment)



Community Recirculating Sand Filters to Drip Dispersal

■ Findings:

- 160 acres total needed
- 11 sites used (40 acre, 32 acre, 2-16 acre, 7-8 acre)
- Recirc. Sand filters can be added with development incrementally (package media filters or gravel beds)
- Anywhere from 4 miles of drip line- 21 miles of line per site for build out. May require discharge to creek.
- O&M- check pumps/controls every 3 months, monitor site, weed on filter, filter material replacement if biological loading persists, ice prevention, skilled personnel, mowing.



● Lagoons

Community Sand Filter Treatment



Solutions, Costs & Future Service

Options	Upgrade Sewer in N. Main	New Sewer, Toms Creek	Deep Cell Lagoons at P.S.	Force Main Along Bypass
Design/ Construction	\$6 million	\$11.2 million	\$3.6 million	\$2-\$4 million
Land Acquisition	Not Estimated	\$175,000	\$500,000	\$ 60,000
Other Costs *	\$50,000	\$100,000	Not Estimated	\$50,000
Future Sand Filter Sites Service	+\$2.8-\$9.5m Design & constr. +\$1.3 m +/- land + Drip Disp. Costs	Not Required	\$2.8-\$9.5m Design & constr. \$1.3 m +/- land + Drip Disp. Costs	\$2.8-\$9.5m Design & constr. \$1.3 m +/- land + Drip Disp. Costs
Other Future Service Costs (Development)	Step/Steg Tank Pumps Collection System (lot to sand filter site)	Collection System (lot to sewer main)	Step/Steg Tank Pumps Collection System (lot to sand filter site)	Step/Steg Tank Pumps Collection System (lot to sand filter site)



Other Costs (Related Costs- PER)

- Engineering – 9%
 - Substantially Complete for Phase I, PER Complete Phase II
- Inspection – 8%
 - Contract Inspection Required for Pump Station and Critical Sections (<\$100,000)
- Surveying – 2%
 - Substantially Complete for Phase I, Required for Phase II
- Legal – 1%
 - Staff Legal Services
- Land and Easements – 5%
 - Separately Estimated, see Chart
- Interest During Construction – 2%
 - Not required, based upon financing proposal



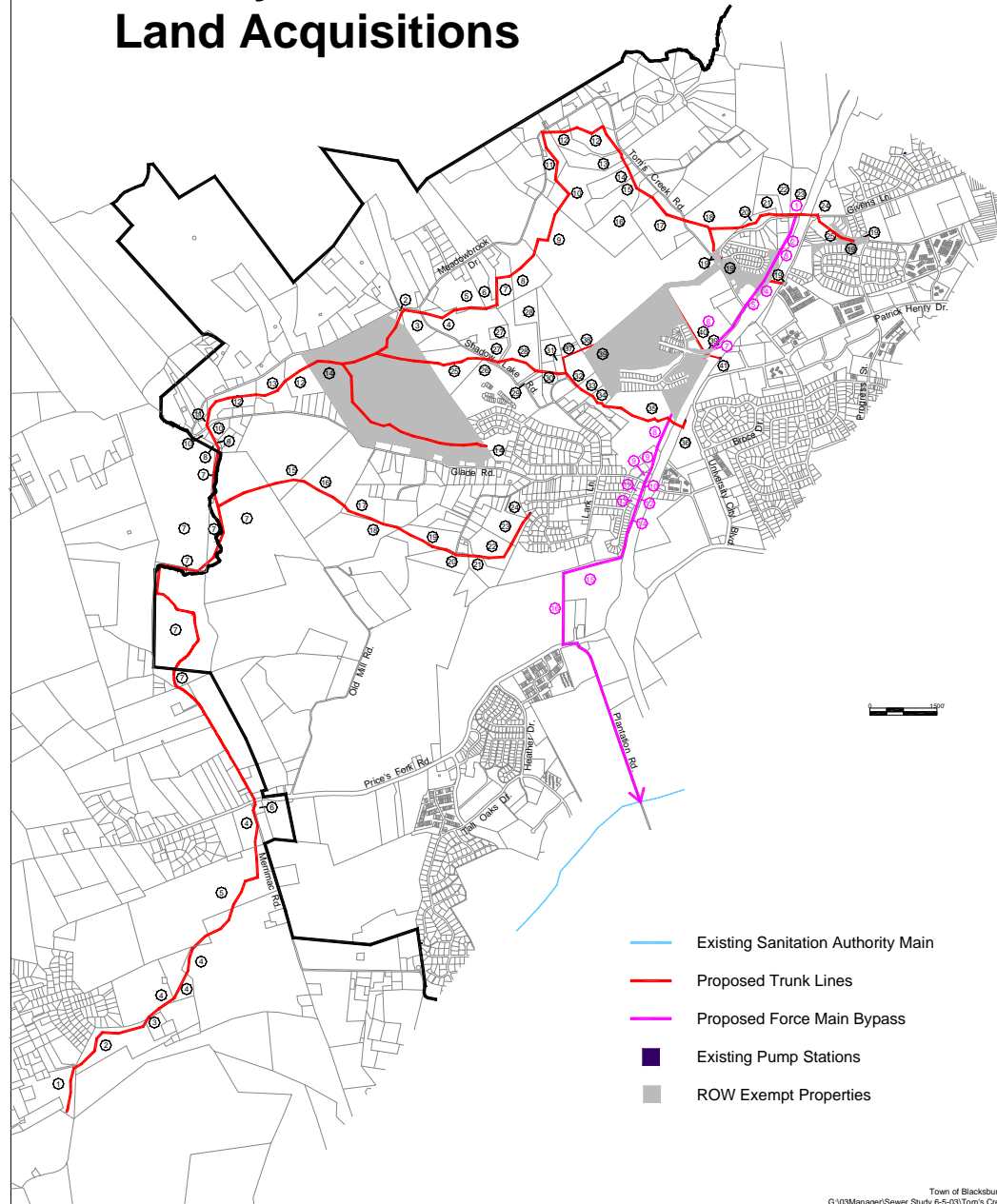
Assessment of Estimated Costs

- Same basis used for pipe options
- Estimate basis was a 2000 estimate for construction plans of Toms Creek Phase I by consultant engineer
- Estimate has been compared with recent bids, including one from April, 2003. Unit prices in estimate are **higher** than the bid prices received.
- Council may desire to hire a Cost Consultant to provide an estimate of probably construction cost.

Solutions, Sewer Rate Impact (Rev.)

Options	Upgrade Sewer in N. Main	New Sewer, Toms Creek	Deep Cell Lagoons at P.S.	Force Main Along Bypass
Availability Fee Impact	No	Option – Raise Availability Fee to \$2500	No	No
Current Sewer Rate (July 2003) Avg. Use: 6000 gal/month	\$3.22/ 1000 gallons	\$3.22/ 1000 gallons	\$3.22/ 1000 gallons	\$3.22/ 1000 gallons
Rate Impact (rev.) (Sewer Rate)	6.2%, 9.1%, and 9.7% over 3 years	5.9%, 8.8%, and 8.6% over 3 years	4.7%, 6.5%, and 6.4% over 3 years	4.7%, 6.5%, and 6.4% over 3 years
Average Increase Monthly Cost/ Home	\$1.20 in year 1 \$3.06 in year 2 \$5.22 in year 3	\$1.14 in year 1 \$2.94 in year 2 \$4.74 in year 3	\$0.90 in year 1 \$2.22 in year 2 \$3.60 in year 3	\$0.90 in year 1 \$2.22 in year 2 \$3.60 in year 3

Sanitary Sewer Plan Land Acquisitions





Solutions: (continued)

Options	Upgrade Sewer in N. Main	New Sewer, Toms Creek	Deep Cell Lagoons at P.S.	Force Main Along Bypass
Maintenance	No Impact	Less PS Mntc. Bush hogging	Screen Mntc. Lagoon& Drip Monitoring Mowing	Additional PS Controls Mntc. Bush hogging
Environmental	Does not require Env. Reviews	VMRC Permit, Phase I Plans reviewed	Health Dept approval for DCL with Mass Drainfield	Requires Health Department Approval
Construction Duration	2-3 years	1-2 years	2-3 years	1-2 years



Solutions: (continued)

Options	Upgrade Sewer in N. Main	New Sewer, Toms Creek	Deep Cell Lagoons at P.S.	Force Main Along Bypass
Other Impacts	Traffic Business Safety	Toms Creek Crossings, Pasture & Wooded areas	Open and Pasture Areas	Open and Wooded areas adjacent to Bypass
Allows Future Use of STEP/STEG in Toms Creek	Yes – to 10-20 Sand Filter and Drain/Drip Field Locations	Yes- to sewer, or to Sand Filter and Drain/Drip Field Locations	Yes – to 10-20 Sand Filter and Drain/Drip Field Locations	Yes – to 10-20 Sand Filter and Drain/Drip Field Locations



Existing Sewer Capacity Analysis

- Current situation: 22 locations exceed pipe capacity during heavy rain. (basement back-ups, manholes filling, overflows).
 - *flow monitor- Prices Fork/campus interface shows 3 overflows, 7 storms since Jan. exceeded pipe capacity. (2075gpm/1750gpm)
- Inflow and Infiltration Abatement Program Recommended, Townwide
 - Inflow 43% increase in sewer flow,
 - Infiltration: 9% increase (wet ground this year).



Pending Impacts to Sewer Capacity

- Buildings : 80 building permits have been issued, will be hooking to sewer
- GIS: 157 vacant lots exist that can get building permits and hook into sewer.
- Pending site plans and subdivisions: Maple Ridge, Papa John's, Northside Park, Copperbeach Townhomes
 - Estimate sewer flows from these and enter into the model.



Sewer Capacity Conclusions

- Current situation: 22 locations exceed pipe capacity during heavy rain. (basement back-ups, manholes filling, overflows).
- With Added Flow from Issued building permits-no added overflow sites
- With Added Flow from Vacant lots able to get building permits-7% increase in overflow amount when heavy rain occurs. 24 locations exceed pipe capacity.
- With Added Flow from Pending subdivisions - 18% increase in overflow amount when heavy rain occurs. 27 locations exceed pipe capacity.
- With above added flows, pumping stations are at capacity. Any pump station upgrades would exacerbate above overflows and locations considerably.



Town Council Direction

- Does Council wish to consider a moratorium on sewer connections in this area?
 - Must be at time of building permit issuance, not plan approval.
 - Moratorium must be a defined time frame.
 - Sewer connections (building permits) upstream of pump stations that do not increase pump station outflow would not be included in moratorium.



Approach to Decision

- Public Input to Town Council

Special Town Council Meeting

Tuesday, June 24, 2003

Town Council Chambers

4 p.m. to 6:30 p.m.

Process Review

- Town Council may consider decision :

Town Council Meeting

Tuesday, July 8, 2003

Town Council Chambers

7:30 p.m.